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conclude

97. (New) A communication station according to claim 60 wherein the signal is transmitted using a CDMA protocol.

REMARKS

Applicants respectfully request reconsideration of the present U.S. Patent application. Claims 40-94 are pending. Claims 40, 41, 43-44, 50, 52-54, 57, 60, 62, 78 and 80 have been amended for reasons not pertaining to patentability but only for purposes of clarity. Claims 95-97 have been added. This leaves in contention claims 40-97.

Claim Rejections – 35 U.S.C. § 103(a)

In **paragraph 5**, claims 40-41, 44-46, 50-51, 53-54, 57-64, 68-69, 78-82, 84-86 and 94 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,037,898 issued to Parish et al ("*Parish*") in view of U.S. Patent 5,745,858 issued to Sato et al ("*Sato*"). In response, Applicants respectfully traverse the rejection of such claims.

In accordance with MPEP §706.02(j), one of the requirements to establish a prima facie case of obviousness is that "the prior art reference (or references when combined) must teach or suggest **all** the claim limitations" (emphasis added) (see also MPEP §2143.03 et seq.). In this instance, as discussed above, none of the cited references suggests or even mention generating a desired radiation level at **a number of locations** within a desired sector. Thus, the references fail, either alone or in combination, to teach or suggest at least this one claim limitation, and therefore fail to make obvious the claimed invention.

Parish discloses a method of calibrating weight vectors for multi-element antenna arrays to compensate for the different receive and transmit apparatus chains. Each apparatus chain

includes the antenna element, cables, filters, RF electronics, physical connections, and analog-to-digital converters if processing in digital. Simply put, different systems are used for each antennae. Each system has unique effects on the signals and therefore must be compensated for in the weight vectors. *Sato* discloses a base station transmitter/receiver capable of varying composite **directivity** of antennas. Neither reference teaches or even suggests in any manner the limitation of generating a desired radiation level at **a number of locations** within a desired sector. Accordingly, *Parish* in view of *Sato*, fail to render obvious **at least** this feature of the invention, as recited, for example, in base claims 40, 60 and 78.

Applicants note that claims 41, 44-46, 50-51, 53-54 and 57-59 depend from patentable base claim 40, claims 61-64 and 68-69 depend from patentable base claim 60, and claims 79-82, 84-86 and 94 depend from patentable base claim 78, and are, therefore, likewise patentable over *Parish* in view of *Sato* by virtue of at least such dependency. Accordingly, Applicants respectfully request that the §103(a) rejection of claims 40-41, 44-46, 50-51, 53-54, 57-64, 68-69, 78-82, 84-86 and 94 be withdrawn.

In **paragraph 6** of the Action, claims 42-43, 47-48, 52, 65-67, 70-71, 73-77, 87, 89-91 are rejected as being unpatentable over *Parish* in view of *Sato* in view of *Dent*, pursuant to 35 USC §103(a). In response, Applicants respectfully traverse the rejection of such claims.

Applicants respectfully submit that, at least for the reasons discussed above, no teaching or suggestion exists in *Parish* in view of *Sato* or in *Dent* to generate a desired radiation level at **a number of locations** within a desired sector. Moreover, *Dent* fails to cure the deficiencies in *Parish* in view of *Sato* identified above. Accordingly, Applicants respectfully submit that *Parish* in view of *Sato* in view of *Dent* fails to make obvious the claimed invention as embodied in independent base claims 40, 60 and 78.

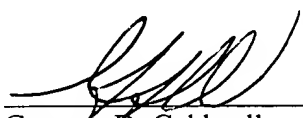
Applicants note that claims 42-43, 47-48, 52 depend from claim 40, claims 65-67, 70-71, 73-77 depend from claim 60, and claims 87, 89-91 depend from claim 78. Accordingly, in addition to any independent basis for patentability, Applicants respectfully submit that claims 42-43, 47-48, 52 65-67, 70-71, 73-77, 87, 89-91 are patentable over the cited references by virtue of at least their dependence on patentable base claims 40, 60 and 78. Thus, Applicants respectfully request that the §103(a) rejection of claims 42-43, 47-48, 52 65-67, 70-71, 73-77, 87, 89-91 be withdrawn.

CONCLUSION

In light of the foregoing amendments and remarks, Applicant respectfully submits that claims 40-97 are in condition for allowance, and such action is earnestly solicited. The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

Please charge any shortages and credit any overcharges to our Deposit Account number 02-2666.

Respectfully submitted,
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Marked Up Version of the Claims Showing Changes Made

40. (Amended) A method comprising:

[developing a plurality of signal processing procedures; and]

iteratively processing a signal through [each of the] a plurality of [developed] signal processing procedures to generate a plurality of processed signals [which, when]; and

sequentially [transmitted] transmitting the plurality of processed signals through a coupled antenna array, [generate] generating a desired radiation level at a number of locations within a desired sector.

41. (Amended) A method according to claim 40, [further comprising:]

[sequentially transmitting each of the generated plurality of processed signals to achieve the desired radiation level at a number of locations in the desired sector during at least one of said sequential transmissions] wherein the signal is transmitted using a CDMA protocol.

42. (Not Amended) A method according to claim 40, wherein the desirable radiation level is a non-null level.

43. (Amended) A method according to claim 40, wherein the desired sector is comprised of a range of azimuths up to [the] a complete range of azimuths of the antenna array.

44. (Amended) A method according to claim 40, [wherein] further comprising developing a plurality of signal processing procedures [comprises] comprising:

selecting a weight vector from a sequence of different weight vectors, wherein elements of the weight vectors selectively modify one or more characteristics of transmission of the signal from each antenna in the antenna array.

45. (Not Amended) A method according to claim 44, wherein the transmission characteristics include one or more of signal amplitude and/or phase.

46. (Not Amended) A method according to claim 45, wherein the sequence of weight vectors share an amplitude value and have random phase values.

47. (Not Amended) A method according to claim 45, wherein the sequence of weight vectors is comprised of weight vectors that are orthogonal.

48. (Not Amended) A method according to claim 47, wherein the orthogonal weight vectors have elements with the same magnitude.

49. (Not Amended) A method according to claim 47, wherein the orthogonal weight vectors are developed from one or more of rows or columns of a complex valued Walsh-Hadamard matrix, rows or columns of a real valued Hadamard matrix, and/or a sequence whose elements are basis vectors of a Fourier transform.

50. (Amended) A method according to claim 45, wherein the sequence of weight vectors is comprised of weight vectors designed to provide a desirable radiation pattern within at least a sub-sector of [an overall] the desired sector.

51. (Not Amended) A method according to claim 50, wherein the desirable radiation pattern is a near omni-directional radiation pattern.

52. (Amended) A method according to claim 50, wherein the [overall] desired sector is the whole range in azimuth.

53. (Amended) A method according to claim 45, wherein the sequence of weight vectors includes weight vectors that are representative of weight vectors designed for transmission to known [subscriber] communication unit(s).

54. (Amended) A method according to claim 53, wherein the weight vectors designed for transmission to known [subscriber] communication unit(s) are determined from spatial signature(s) associated with each of the [subscriber] communication unit(s).

55. (Not Amended) A method according to claim 45, wherein the weight vectors are determined from weight vectors designed for transmission to known subscriber unit(s) using a vector quantization clustering process.

56. (Not Amended) A method according to claim 55, the vector quantization clustering process comprising:

assigning an initial set of weight vectors as a current set of representative weight vectors;

combining each designed for subscriber unit weight vector with its nearest representative weight vector in the current set, according to some association criterion;

determining an average measure of a distance between each representative weight vector in the current set and all weight vectors combined with that representative weight vector;

replacing each representative weight vector in the current set with a core weight vector for all the weight vectors that have been combined with that representative weight vector; and

iterative repeating the combining, determining and replacing steps until a magnitude of the difference between the average measure in a present iteration and the average distance in the previous iteration is less than a threshold.

57. (Amended) A method according to claim 40, wherein the plurality of signal processing procedures is commensurate with the plurality of antennae within the antenna array used to sequentially transmit the plurality of processed signals.

58. (Not Amended) A storage medium comprising content which, when executed by an accessing machine, implements a method according to claim 40.

59. (Not Amended) A wireless communication system element comprising:
a storage medium including content; and

a processor element, coupled with the storage medium, to execute at least a subset of the content to implement a method according to claim 40.

60. (Amended) A subscriber unit comprising:

two or more antenna configured as an antenna array; and

processing element(s), coupled with the antenna array, to [develop a plurality of signal processing procedures, and to] iteratively process a signal through [each of the] a plurality of [developed] signal processing procedures to generate a plurality of processed signals which, when sequentially transmitted via the antenna array, generate a desired radiation level at a number of locations within a desired sector.

61. (Not Amended) A subscriber unit according to claim 60, wherein the processing element(s) are comprised of one or more of an application specific integrated circuit (ASIC), a digital signal processor (DSP), a field-programmable logic array (FPGA) and/or a microcontroller resident within the subscriber unit.

62. (Amended) A subscriber unit according to claim 60, further comprising:

a transceiver, coupled with the antenna array and the processor element(s), to sequentially transmit each of the generated plurality of processed signals to achieve the desired radiation level at a number of locations in the desired sector during at least one of said sequential transmissions, wherein sequential transmission of the generated plurality of processed signals comprises a broadcast transmission.

63. (Not Amended) A subscriber unit according to claim 62, wherein the processor element(s) are integrated within the transceiver.
64. (Not Amended) A subscriber unit according to claim 63, wherein the transceiver comprises at least one processor element for each antenna within the antenna array.
65. (Not Amended) A subscriber unit according to claim 60, wherein the processor element(s) select a radiation level that is a non-null level.
66. (Not Amended) A subscriber unit according to claim 60, wherein the desired sector is comprised of a range of azimuths up to a complete range of azimuths of the antenna array.
67. (Not Amended) A subscriber unit according to claim 66, wherein the processor element(s) select a weight vector from a sequence of different weight vectors to develop the processing procedure, wherein elements of the weight vectors selectively modify one or more characteristics of transmission of the signal from each antenna in the antenna array.
68. (Not Amended) A subscriber unit according to claim 67, wherein the transmission characteristics include one or more of a signal amplitude and/or phase.
69. (Not Amended) A subscriber unit according to claim 67, wherein the sequence of weight vectors share an amplitude value and have random phase values.

70. (Not Amended) A subscriber unit according to claim 67, wherein the sequence of weight vectors are comprised of weight vectors which are orthogonal to one another.

71. (Not Amended) A subscriber unit according to claim 70, wherein the orthogonal weight vectors share a common magnitude.

72. (Not Amended) A subscriber unit according to claim 70, wherein the processor element(s) develop the orthogonal weight vectors from one or more of rows or columns of a complex valued Walsh-Hadamard matrix, rows or columns of a real valued Hadamard matrix, and/or a sequence whose elements are basis vectors of a Fourier transform.

73. (Not Amended) A subscriber unit according to claim 67, wherein the sequence of weight vectors is comprised of weight vectors designed to provide a desirable radiation pattern within at least a sub-sector of an overall desired sector.

74. (Not Amended) A subscriber unit according to claim 73, wherein the processor element(s) develop the sequence of weight vectors designed to provide a desirable radiation pattern based, at least in part, on information associated with known communication station(s) in the desired sector.

75. (Not Amended) A subscriber unit according to claim 74, wherein the processor elements develop the sequence of weight vectors from spatial signature(s) associated with the known communication station(s).

76. (Not Amended) A subscriber unit according to claim 74, wherein the processor element(s) develop the sequence of weight vectors using a vector quantization clustering process.

77. (Not Amended) A subscriber unit according to claim 70, wherein the processor element(s) develop a plurality of signal processing procedures commensurate with the plurality of antennae comprising the antenna array.

78. (Amended) A communication station comprising:
two or more antenna configured as an antenna array; and
processing element(s), coupled with the antenna array, to [develop a plurality of signal processing procedures, and to] iteratively process a signal through [each of the] a plurality of [developed] signal processing procedures to generate a plurality of processed signals which, when sequentially transmitted via the antenna array, generate a desired radiation level at a number of locations within a desired sector.

79. (Not Amended) A communication station according to claim 78, wherein the processing element(s) are comprised of one or more of an application specific integrated circuit (ASIC), a digital signal processor (DSP), a field-programmable logic array (FPGA) and/or a microcontroller resident within the communication station.

80. (Amended) A communication station according to claim 78, further comprising:
one or more transceivers, coupled with the antenna array and the processor element(s), to sequentially transmit each of the generated plurality of processed signals to achieve the desired

radiation level at a number of locations in the desired sector during at least one of said sequential transmissions, wherein sequential transmission of the generated plurality of processed signals comprises a broadcast transmission.

81. (Not Amended) A communication station according to claim 80, wherein the processor element(s) are integrated within one or more of the transceiver(s).

82. (Not Amended) A communication station according to claim 80, wherein the transceiver comprises at least one processor element for each antenna within the antenna array.

83. (Not Amended) A communication station according to claim 78, wherein the desired sector is comprised of a range of azimuths up to a complete range of azimuths of the antenna array.

84. (Not Amended) A communication station according to claim 78, wherein the processor element(s) select a weight vector from a sequence of different weight vectors to develop the processing procedure, wherein elements of the weight vectors selectively modify one or more characteristics of transmission of the signal from each antenna in the antenna array.

85. (Not Amended) A communication station according to claim 84, wherein the transmission characteristics include one or more of a signal amplitude and/or phase.

86. (Not Amended) A communication station according to claim 84, wherein the sequence of weight vectors share an amplitude value and have random phase values.

87. (Not Amended) A communication station according to claim 84, wherein the sequence of weight vectors are comprised of weight vectors which are orthogonal to one another.

88. (Not Amended) A communication station according to claim 87, wherein the processor element(s) develop the orthogonal weight vectors from one or more of rows or columns of a complex valued Walsh-Hadamard matrix, rows or columns of a real valued Hadamard matrix, and/or a sequence whose elements are basis vectors of a Fourier transform.

89. (Not Amended) A communication station according to claim 84, wherein the sequence of weight vectors is comprised of weight vectors designed to provide a desirable radiation pattern within at least a sub-sector of an overall desired sector.

90. (Not Amended) A communication station according to claim 89, wherein the processor element(s) develop the sequence of weight vectors designed to provide a desirable radiation pattern based, at least in part, on information associated with known subscriber unit(s) in the desired sector.

91. (Not Amended) A communication station according to claim 90, wherein the processor elements develop the sequence of weight vectors from spatial signature(s) associated with the known subscriber unit(s).

92. (Not Amended) A communication station according to claim 90, wherein the processor element(s) develop the sequence of weight vectors using a vector quantization clustering process.

93. (Not Amended) A communication station according to claim 92, wherein performing the vector quantization cluster process, the processor element(s):

assign an initial set of weight vectors as a current set of representative weight vectors;

combine each designed for subscriber unit weight vector with its nearest representative weight vector in the current set, according to some association criterion;

determine an average measure of a distance between each representative weight vector in the current set and all weight vectors combined with that representative weight vector;

replace each representative weight vector in the current set with a core weight vector for all the weight vectors that have been combined with that representative weight vector; and

iteratively repeat the combining, determining and replacing elements until a magnitude of the difference between the average measure in a present iteration and the average distance in the previous iteration is less than a threshold.

94. (Not Amended) A communication station according to claim 78, wherein the processor element(s) develop a plurality of signal processing procedures commensurate with the plurality of antennae comprising the antenna array.

95. (New) A method according to claim 53 wherein the communication unit(s) is at least one of a subscriber unit and a base station.

96. (New) A subscriber unit according to claim 60 wherein the signal is transmitted using a CDMA protocol.

97. (New) A communication station according to claim 60 wherein the signal is transmitted using a CDMA protocol.